PATENT SPECIFICATION

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DRAWINGS ATTACHED

1034713

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Int. Cl.:—B 29 d

COMPLETE SPECIFICATION

Method and apparatus for producing Jacketted or Coated Tablets

I, HANS KRUSE, a German Citizen, of 24 Grabauer Strasse, Schwarzenbek near Hamburg, Germany, trading as WILHELM FELTE, PRÄZISIONSWERKZEUG-FABRIK do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in the following statement:—

The present invention relates to a method and apparatus for producing coated, jacketted or enclosed tablets for example for medicinal or pharmaceutical purposes, where an active ingredient is surrounded by a casing or shell of another material. It is known to produce such tablets by means of tabletting machines in which a part of the material which is to represent the casing is inserted in the form of a powder into a matrix and then the core of the tablet is inserted. After inserting a further fractional amount of the casing product the pressing operation for forming the finished tablet is effected.

Since it is desirable that the tablet core should lie centrally as far as possible, that is to say that the enclosing shell shall have a uniform wall thickness, various devices have been proposed by which the core can be inserted as accurately as possible in a central position. So far as rotary table presses are concerned such devices are not only complicated but cannot even be utilised since at the travel speed of the horizontally rotating matrix discs the central position of the tablet core is in any case lost due to displacement in the casing powder.

The invention is directed to eliminating these disadvantages and furthermore to providing means by which the production of a pre-pressed tablet core can be avoided, which has previously always been necessary as a separate operation, yet the use of a pre-pressed core is not excluded.

The method according to the invention comprises forming a pressed cup-shaped first-stage shell of a first tablet material, subjecting said shell to further endwise pressure to reduce the shell to a shape having a shallow depression suitable for receiving core material, supplying such core material to the depression in such shell, supplying a further amount of coating material to cover the core material in said shell and subjecting the core and the shell to further pressure to complete the formation of the tablet.

From the foregoing it will be seen that according to the invention a coherent cup-like pressing or moulding of the enclosing material is formed by a pressing operation in the matrix of the tabletting machine, having for example a rotary table. The core mass consisting for example of a powder or a granular product, is then filled into this upwardly open shell remaining in the matrix after pre-pressing of the shell, preferably in the next working stage. After pressing the core mass the nearly filled shell receives a further amount of enclosing material—which may moreover also consist of a granular product or a powder. The final method step consists in closing the shell or casing in a further pressing operation and thereby the tablet is finished.

The invention ensures that the tablet core always remains centrally in the tablet. Furthermore the considerable advantage is obtained that the production of the tablet core can be effected without using an additional machine.

If for special pharmaceutical reasons it is necessary that the tablet core must be finished in advance, then the aforesaid production of a cup-shaped shell in which the finished tablet core is inserted, is in any event of considerable advantage. The shell pre-finished according to the invention ensures that the core is inserted centrally and this position is maintained without separate complicated inserting or holding devices being necessary.

Several constructional examples of the in-

vention are shown in diagrammatic form on the accompanying drawings wherein:

Figs. 1—27 show the various method steps up to the production of a finished tablet.

Fig. 28 shows a press tool in side view and partly in section,

Figs. 29—31 show the production of a lenticular tablet,

Fig. 32 is a plan of the filling frame,

Fig. 33 is a side view of a matrix provided with a shell, and

Figs. 34—39 show the insertion of a finished core in a pre-pressed shell.

In Fig. 1 a finished tablet T is shown which is pressed in a matrix 1 by means of a top plunger 2 and a bottom plunger or ejector 3. The tablet T embodies a core K and a shell or casing H. In Fig. 2 the finished tablet T is being ejected by means of the ejector 3. The top plunger 2 remains initially in contact with the tablet in order to limit free movement of the latter.

In Fig. 3 the tablet T is shown completely ejected from the matrix 1 and the tablet can now be carried off in manner not shown so that the matrix 1 is available for the production of further tablets. This occurs according to the invention in the following way:

As shown in Figs. 4 and 5 the shell material M, supplied in known manner from a filler box or the like which is not shown, is filled into the matrix 1, the bottom plunger 3 having been lowered sufficiently into the matrix. In Fig. 6 the pressing operation carried out by the top plunger 2 is shown, which is such as to produce an upwardly open and coherent cup-shaped pressed shell H as indicated on Fig. 7. For this purpose the top plunger 2 is of telescopic form as shown in Fig. 28, that is to say a further presser plunger 2*a* is guided within the plunger proper 2.

As shown in Figs. 8, 9, 10, 11 and 12 further pressure is applied to the top plunger 2 until the shell H has reached a shape having a shallow depression such that a suitable amount of tablet core material M1 can be received, as shown in Fig. 13 when the top plunger 2 is raised. It will be noted that the shallow depression has substantially less depth than the recess in the shell H and that the plunger 2*a* is partly retracted into the plunger 2 during this further pressing.

After surplus core material M1 has been struck off as shown in Fig. 14, the pressing operation is carried out again as shown in Figs. 15 and 16, whereupon, after return of the top plunger 2 further core material M2 can in some cases be inserted in the matrix 1 and can thus be filled in to the already pressed core material, as shown in Fig. 17.

After again striking off the surplus core material M2 (Fig. 18) the pressing operation is again carried out as shown in Figs. 19 to 22, the core material M2 becoming united with the core material M1. Then the top plunger 2 with its presser plunger 2a is drawn back as shown in Fig. 23 and finally further shell material M is applied, then as shown in Fig. 25 surplus amounts of shell material are struck off and the final pressing operation is carried out as shown in Figs. 26 and 27 so that now the finished tablet already shown in Fig. 1 is produced.

Figs. 29 to 31 show some of the steps in the production of a lenticular tablet T where the individual method steps are the same as those already described, but with the difference that the pressing surfaces of the plungers 2, 2a and 3 have a correspondingly concave shape.

In the last embodiment of the invention it is however possible that undesired mixing of the two materials occurs at the edge zones between the shell H and the tablet core K. In order to hinder this a pointed striker member 4 is provided, as shown in Fig. 32, which is arranged fixedly in the region of the filling frame 5 and is arranged so that the point pierces the ring of pressed shell material H1 standing above the plane of the matrix 1, as indicated in Fig. 33, and pushes the shell material to each side of the centre of the core and minimises the possibility of the shell material entering the cavity.

Figs. 34 to 39 show the manner in which a finished pressed core K can be inserted in each of the pre-shaped shells H, instead of using a core material which is intended to be compressed in place. In this case a stationary guide 6 is provided which supports the cores K so that they can enter the shells H located in the matrices 1 of a matrix wheel, not shown, which is moved in the direction of the arrow P.

In order to ensure that two cores K cannot be deposited in each shell H a deflector member 7 is provided in the horizontal plane obliquely to the guide 6, by which a single core K in each case is pushed into the shell H before the shell and the core are finally pressed in the associated pressing operation (Figs. 37 and 38). The deflector 7 is preferably in the form of a rotary brush.

WHAT I CLAIM IS—

1. Method for producing coated tablets, comprising forming a pressed cup-shaped first-stage shell of a first tablet material subjecting said shell to further endwise pressure to reduce the shell to a shape having a shallow depression suitable for receiving core material, supplying such core material to the depression in such shell, supplying a further amount of coating material to cover the core material in said shell and subjecting the core and the shell to further pressure to complete the formation of the tablet.

2. Method according to claim 1, wherein a pre-prepared core is inserted in the shell.

3. Method according to claim 1, wherein the core material in flowable form is filled into the shell.

4. Method according to claim 3, comprising supplying successive portions of core material, subjecting said core material to pressure after each portion has been inserted supplying a further quantity of coating material, subjecting said additional quantity of coating material to pressure and then subjecting the completed tablet to final pressure to form the completed and finished tablet.

5. Method according to claim 4, wherein pressure is exerted on the coating material during the production of the finished tablet by means of concavely formed presser surfaces to produce a lenticular tablet.

6. Apparatus for producing a coated tablet, comprising a matrix, presser devices operative in said matrix in two stages, first to form from a first tablet material an initial cup-shaped coherent pressing and thereafter to subject the initial cup-shaped pressing to endwise pressure to reduce the depth thereof to a shell having a depression just sufficient for receiving core material, means to supply core material to said depression, means to supply additional first material over said core material and means to cause said presser devices to compress said materials to produce a finished tablet including a centre core of core material enclosed in coating material.

7. Apparatus according to claim 6, comprising a top plunger and a presser plunger guided telescopically therein.

8. Apparatus according to claim 6, comprising a rigidly mounted striker member provided in the region of a filling frame.

9. Apparatus according to claim 6, comprising an obliquely disposed longitudinal deflector member for guiding tablet cores into the cup-shaped pressing.

10. Apparatus according to claim 9 in which the deflector member is in the form of a rotary brush.

11. Method and apparatus for producing coated tablets, substantially as herein described and illustrated.

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Chartered Patent Agents.

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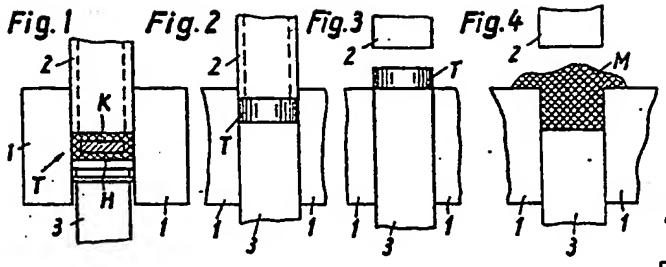

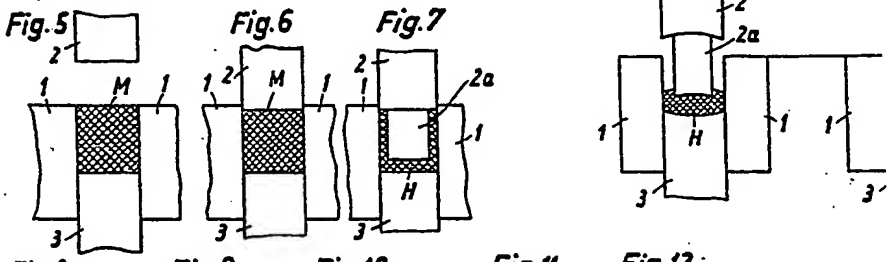

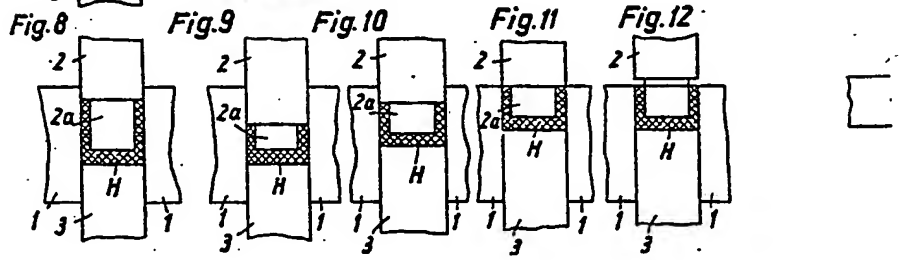

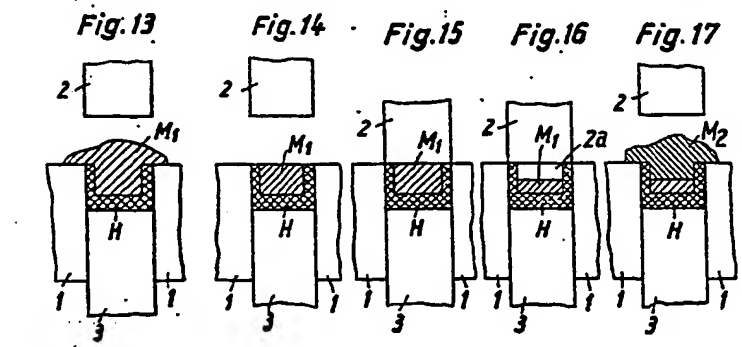

1034713 COMPLETE SPECIFICATION
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Sheet 1

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Fig.34 *Fig.35* *Fig.36* *Fig.37* *Fig.38*

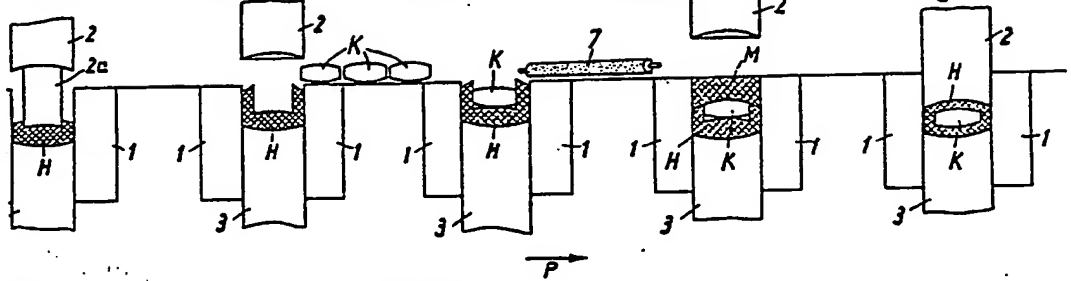

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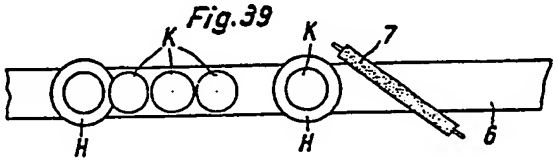
Fig.39



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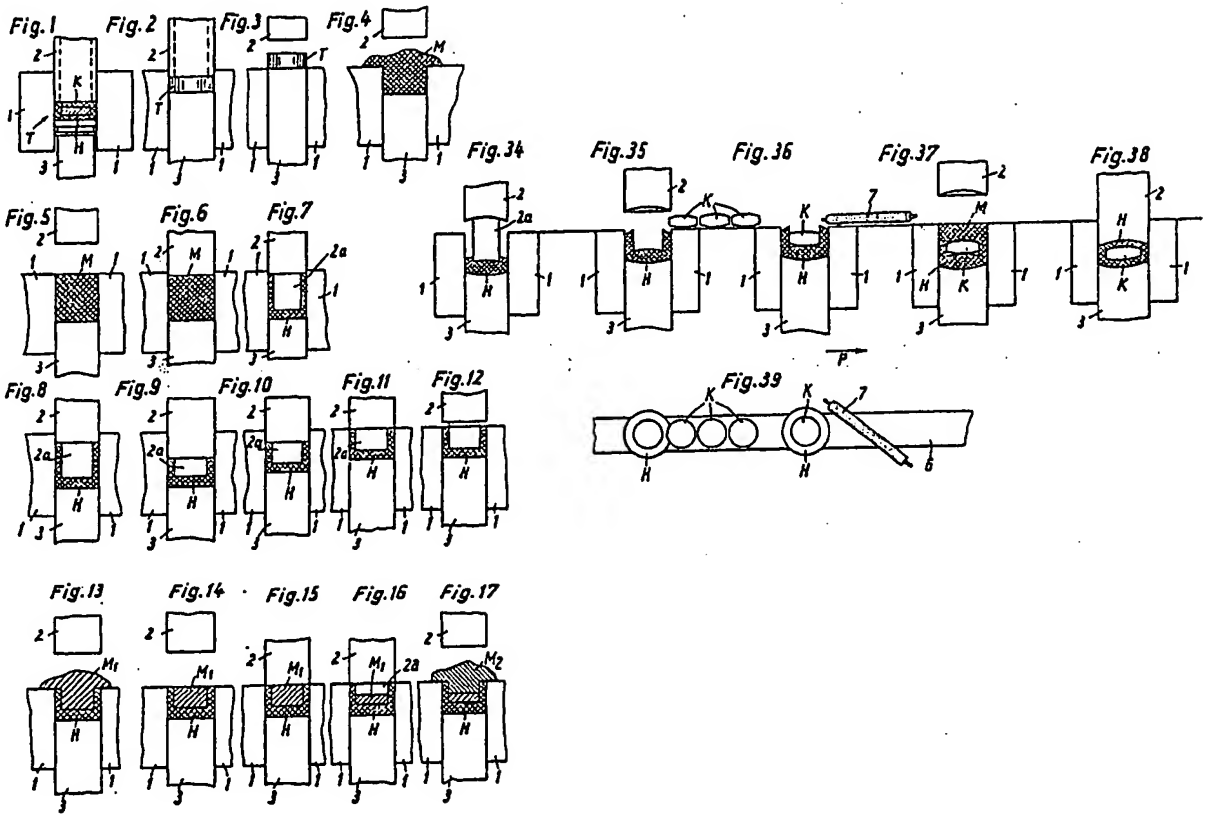

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2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

Fig.18

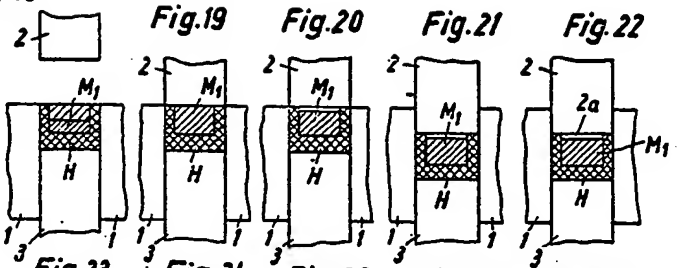


Fig.19

Fig.20

Fig.21

Fig.22

Fig.23

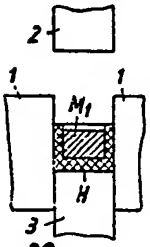


Fig.24

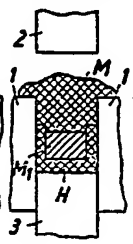


Fig.25

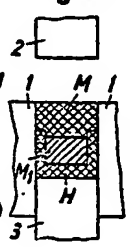


Fig.26

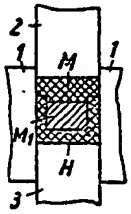


Fig.27

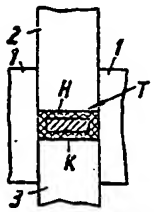


Fig.28

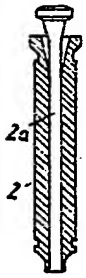


Fig.29

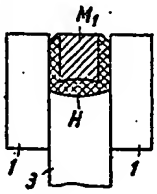


Fig.30

Fig.31

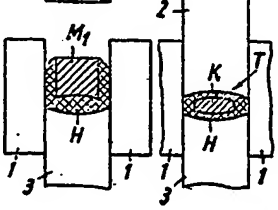
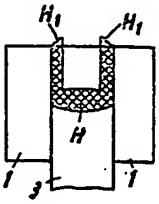


Fig.33



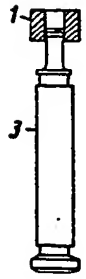


Fig.32